Pollutants Identified for Emissions Testing Under ICCR

presented to:

ICCR Coordinating Committee Long Beach, California

presented by:

Sam Clowney, Tennessee Gas Pipeline, on behalf of the Reciprocating Internal Combustion Engine (RICE) Work Group

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Goals for Presentation

- Provide the Coordinating Committee background on the need for RICE emissions testing
- Inform the Coordinating Committee about proposed contents of the RICE test plan
- Present pollutants proposed for emissions testing
- Obtain Coordinating Committee consensus on proposed lists of pollutants for emissions testing

Background on Need for RICE Emissions Testing (1 of 4)

- EPA extracted RICE emissions tests from STIRS to develop RICE emissions database for ICCR
- Limited HAP emissions data reported
 - Tests primarily conducted for California Air Resources Board
 - 28 test reports, 104 tests, and approx. 80 engines tested
 - Only one report each for landfill gas and propane included
- Little data about control devices (NOx, VOC, CO) that may affect HAP emissions in RICE database
 - Few tests before-and-after controls for natural gas
 - No tests before-and-after controls for other fuels

Background on Need for RICE Emissions Testing (2 of 4)

- Unexplained and wide variation in emissions data reported in RICE emissions database
- Reported formaldehyde levels may be too low in some cases due to test methods used
 - GRI research shows that high levels of NO2 in some RICE exhaust interferes with DNPH-based methods
 - T&M Work Group guidance on this issue indicates tests may underestimate formaldehyde emissions from engines due to NO2 levels
- RICE Work Group developed Information Collection Request (ICR) to gather more data
 - Who and What Subgroups

Background on Need for RICE Emissions Testing (3 of 4)

- When RICE excluded from ICR, Work Group established Emissions and Populations Subgroups
 - Goal: to further review databases and identify data gaps
- Emissions Subgroup's review of emissions tests reveals that key information about engineering and operating parameters lacking from test reports
 - Manufacturer and model
 - Cycle (2- or 4-stroke)
 - Air to Fuel Ratio (rich- or lean-burn)
 - Horsepower and speed (rated and as tested)
- Subgroup concludes that operating data cannot explain wide variation in emissions levels reported

Background on Need for RICE Emissions Testing (4 of 4)

- Although final decisions on use of data in the ICCR Emissions Database have not yet been made, there are emissions data gaps
- Consensus that more emissions test data is needed:
 - emissions from engines across entire operating range
 - emissions before and after controls, to determine efficiency of controls for HAPs
- Emissions Subgroup established to develop RICE test plan that will address data gaps

Overview of RICE Test Plan

- 5 Key Components of RICE Test Plan
 - 1 Pollutants to be measured
 - 2 Test methods that will be used to quantify HAPs and criteria pollutants (working with T&M Work Group)
 - 3 Protocol to document RICE engineering and operating parameters during emissions testing
 - 4 Categories of RICE, fuels, and control devices to be tested
 - 5 Methodology to prioritize emissions testing if limited testing funds are available
- Today's presentation is on pollutants to be measured

Schedule for RICE Test Plan

Identify test methods
July 24 WG mtg

Complete generic protocol July 24 WG mtg

Begin work on list of RICE and July 24 WG mtg controls to be tested

Begin work on methodology to July 24 WG mtg prioritize testing

Complete list of RICE and controls August 1997

Complete prioritization methodology August 1997

Complete test plan
September 1997

Pollutants

- Process to identify pollutants for testing
- Pollutants to be measured for natural gas, diesel, digester gas, landfill gas, and propane
- Proposal for Coordinating Committee Consensus

Process (1 of 4)

Use emissions data reported in the RICE emissions database for ICCR as a starting point

- Pollutant list already focused -- 39 HAPs included in database out of 188 HAPs listed in Section 112(b) of CAA
- High confidence that other HAPs, not included in test reports, are not reasonably anticipated for RICE
 - » Most reports from California program -- air agencies assisting sources in identification of pollutants
 - » Testing & Monitoring Work Group reviewed entire list of 188 HAPs and suggested which pollutants may be emitted from RICE -- lists match closely
 - » Note: dioxin not included in test reports -- Work Group reviewing whether dioxin can be reasonably anticipated

- Insert Slide #1 from POLST2.PPT
 - 39 Pollutants Included in RICE Emissions Database

Process (2 of 4)

Identify pollutants appropriate for each fuel:

diesel fuel

natural gas

digester gas

propane

- landfill gas
- Some pollutants reported for all, or most fuels
- Other pollutants reported only for certain fuels
 - » Different fuel compositions result in different emissions
 - For example, presence of metals or chlorine

- Insert Slide #2 from POLST2.PPT
 - Pollutants Included in Tests (Table)

Process (3 of 4)

Use results of emissions tests to further focus the list of HAPs for each fuel

- Include all pollutants that are reported above the detection limits -- even if only above once
- Eliminate pollutants that were tested for, but never detected (all reported as ND in the database)

- Insert Slide #3 from POLST2.PPT
 - 31 Pollutants Detected
- Insert Slide #4 from POLST2.PPT
 - Pollutants Reported as "Detects" (Table)

Process (4 of 4)

Compare pollutant lists developed by RICE Work Group with other pollutant lists

- For natural gas and diesel fuel:
 - » California Air Resources Board developed a list of HAPs likely to be emitted from combustion sources
 - » Testing & Monitoring Work Group reviewed the list of 188 HAPs and provided lists of HAPs likely to be emitted from RICE using natural gas and diesel
- For digester gas, landfill gas, and propane:
 - » Testing & Monitoring preparing a list

- Insert Slide #5 from POLST2.PPT
 - Comparison of Lists: Natural Gas (Table)
- Insert Slide #6 from POLST2.PPT
 - Comparison of Lists: Diesel Fuel (Table)

Proposal for Consensus (1)

The following 7 pollutants should be included in test plans for all IC engines, regardless of fuel:

- BTEX
 - » Benzene
 - » Toluene
 - » Ethylbenzene
 - » Xylene(s)
- Aldehydes
 - » Formaldehyde
 - » Acetaldehyde
 - » Acrolein

Proposal for Consensus (2)

Include additional pollutants for specific fuels:

- Diesel Fuel
 - 1,3-butadiene
 - Hexane
 - Naphthalene
 - POMs (PAHs)
 - Metals:
 - » Lead
 - » Chromium
 - » Mercury
 - » Cadmium
 - » Nickel
 - » Manganese
 - » Beryllium
 - » Selenium

- Natural Gas
 - 1,3-butadiene
 - Methylene Chloride
 - 1,1,2,2-Tetrachloroethane
 - Chlorobenzene
 - Chloroethane
 - Naphthalene
 - POMs (PAHs)

Note: Pollutant lists are only for the purposes of emissions testing under ICCR.

Pollutants for possible regulation under ICCR are yet to be addressed by the RICE Work Group.

Proposal for Consensus (3)

Include additional pollutants for specific fuels:

- Digester Gas
 - Methylene Chloride
 - Styrene
 - Vinyl Chloride
 - Dichlorobenzene
- Propane
 - Naphthalene

- Landfill Gas
 - Carbon Tetrachloride
 - Chloroform
 - Vinyl Chloride
 - 1,1,1-Trichloroethane
 - Perchloroethylene
 - Trichloroethylene

- Insert Slide #7 from POLST2.PPT
 - Proposed Pollutants for Emissions Tests Under ICCR